these two divisons, which he proposed to call suborders of Dr. Dana's order *Merostomata*. He also pointed out that the *Xiphosura* were divisable into three genera :—1st, *Belinurus*, Baily, having 5 freely articulated thoracic segments, and 3 anchylosed abdominal ones and a telson; 2nd, *Prestwichia*, a new genus, having the thoracic and abdominal segments anchylosed together; and 3rd, *Limulus*, Müller, having a head composed of 7 cephalic and 1 thoracic segments, followed by 5 coalesced thoracic somites bearing branchiæ, and 1 or more coalesced apodal abdominal somites, to which is articulated the telson. Although so great a dissimilarity exists between *Pterygotus* and *Limulus*, yet in the genera *Hemiaspis*, *Exapinurus*, and *Pseudoniscus* we have forms which, in the number of body-rings, are intermediate.

The order *Merostomata* offers a parallel group to the *Decapoda*, the *Eurypterida* representing the *Macrura*, and the *Xiphosura* the *Brachyura*. The author did not, however, intend by this comparison to indicate that *Limulus* was higher in the Crustacean scale than *Pterygotus*, but rather that the former was one of those low but persistent types (like the Brachiopoda) which have remained unchanged through long geological ages, whilst forms capable of further development, like *Pterygotus*, have been modified and swept away.—*Proc. Geol. Soc.* Nov. 21, 1866.

On the Structure of the Skin in Stellio caucasicus.
By Professor F. de Filippi.

In his travels in Georgia and Persia, M. de Filippi observed the *Stellio caucasicus* in great abundance and at the most various elevations. Contrary to Duméril and Wilson's account of the habits of *Stellio vulgaris*, he ascertained, by the dissection of a great number of individuals, that this animal feeds chiefly upon vegetable materials, and that insects form but a small portion of its nourishment. This fact is not without interest, as the known herbivorous Saurians (*Iguana*, *Amblyrhynchus*, *Cyclura*, *Sauromalus*) are peculiar to America.

But the most remarkable peculiarity of this species consists in a change of colour under the influence of light, perfectly similar to that of the Chameleons. An analogous phenomenon has certainly been mentioned as occurring in other Saurians, especially in certain species of *Agama*, *Anolis*, and *Polychrus*; but nothing of the kind had previously been suspected in any *Stellio*. The scale of variation of colour, indeed, is greater in the Chameleons than in *Stellio caucasicus*; but, on the other hand, the latter seems to present a greater distance between its maximum paleness and its most complete darkening; in other words, the phenomenon is more varied in the Chameleon, and more striking in the *Stellio*. Moreover these changes of colour occur only in the adults, the young being exempt from them, contrary to what is observed in the Chameleons. The change is particularly distinct on the lower part of the body, and diminishes towards the back. The Chameleon becomes dark when it is exposed

to a bright light, and in direct proportion to the intensity of the light. The opposite is the case with the *Stellio*, which becomes paler when exposed to the light of the sun. From this M. de Filippi concludes that the passive state of the skin is that which corresponds to the paleness, because M. Brücke has demonstrated, by the aid of irritation by galvanism, that in the Chameleon the active state of the skin corresponds to the pale, and the passive state to the darkened condition. But this hypothesis of the author needs confirmation.

However, the causes of the change of colour do not appear to be identical in the Chameleons and the *Stellio*. In the former M. Brücke discovered beneath the epidermis a layer of polyhedric cells, which, when seen under the microscope without the addition of any liquid, present the most vivid colours of interference; these colours disappear in liquids—that is to say, in substances of which the index of refraction differs less from that of the layer in question than the index of refraction of the air. M. Brücke consequently calls this layer the *stratum of interference*, and he thinks that the effects of coloration produced by it are due to the same causes as the luminous effects in their laminæ, in consequence of the interposition of an extremely thin layer of air between the cells of this stratum. This layer would concur with the combination of two sorts of pigment in the change of colour of the Chameleon. M. de Filippi does not think that phenomena of interference play any part in the changes of colour of *Stellio*. The scale of colours is besides so restricted in those animals, that the change may be sufficiently explained by the combination of two pigments of which he has detected the existence in the skin—one yellowish white, occupying the superficial regions of the dermis, the other dark, more deeply seated, but capable of covering the former more or less abundantly. If the changes of colour do not occur in young individuals, this is because the black pigment is deficient in them.

As regards the mechanism of the change of colour, it cannot be compared with that of the chromatophores of the Cephalopoda; for no muscular fibres are to be found in the layer of the dermis which contains the pigment-cells. It is by the same consideration that Leydig was led to explain the changes of colour of the Tree-Frogs and Tadpoles by the amœboid contractions of the protoplasm of the pigment-cells.

In the case of the *Stellio*, M. de Filippi has recourse to a somewhat different explanation. The papillæ of the dermis contain in their deeper layers a network of black pigment-cells, which emit processes to the surface of the dermis, above the whitish pigment. The black pigment may be injected by means of these processes through the superficial whitish pigment, and cause the change of colour. This injection of the black pigment is ascribed by the author, rather hypothetically indeed, to the turgescence of a vascular glomerule which occurs in each dermal papilla.—*Mem. della R. Accad. di Torino*, 1865; *Bibl. Univ.* 25th October, 1866, *Bull. Sci.* pp. 198–200.